CAMBRIDGE SYSTEMATICS

Oregon State Rail Plan

Passenger Rail Needs Assessment

draft

report

prepared for

Oregon Department of Transportation

prepared by

Cambridge Systematics, Inc.

March 31, 2014

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Cambridge Systematics, Inc.
555 12th Street, Suite 1600
Oakland, CA 94607

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4.0 Passenger Rail Needs Assessment

This chapter presents an assessment of how well the intercity passenger rail system meets the state's travel needs and improvements necessary to improve the system and meet Oregon's service goals.

The discussion of Oregon's intercity passenger rail needs is organized into four sections:

1. **Existing intercity passenger rail service**, which provides an overview of current Amtrak ridership trends and areas of potentially untapped demand;
2. **Intercity passenger rail service goals**, which outlines the draft service goals to improve passenger rail service along the Portland to Eugene corridor as defined in the 2010 Oregon Rail Study;
3. **Operational Needs**, which describes passenger rail needs related to the safety, efficiency, and reliability of intercity and commuter rail operations; and
4. **Physical Needs**, which identifies improvements to rail infrastructure and rolling stock necessary to ensure that the rail system has adequate capacity to serve Oregon's travel needs.

A detailed examination of passenger train service and future needs along the Eugene to Portland corridor is currently the focus of a comprehensive environmental review process that is being conducted by Oregon DOT in cooperation with stakeholders. That effort includes a detailed analysis of passenger demand, alignment and service options. Thus, the following discussion largely focuses on current conditions in the context of the 2010 Oregon Rail Study goals and findings.

4.1 EXISTING INTERCITY PASSENGER RAIL SERVICE

Intercity passenger rail service connects several of Oregon's communities, as well as locations outside the State. All operated by Amtrak, there are three services as follows (see Figure 4.1):

1. **Cascades** (Eugene – Portland – Seattle – Vancouver, B.C.). Amtrak Cascades serves the Willamette Valley from Eugene to Portland and north to Seattle and Vancouver, B.C. Between Eugene and Portland there are two daily round-trip frequencies. One of these trains provides direct service between the Willamette Valley and Seattle, while the other offers a connection for Seattle at Portland. In addition, three daily round-trip frequencies connect

Portland with points north, with one northbound train going through to Vancouver, B.C. Thruway buses supplement rail service along the Cascades corridor. Daily, four additional frequencies provide service between Portland and the University of Oregon-Eugene. On the northern portion of the Cascades Corridor, Thruway buses provide four additional frequencies between Seattle, WA and Vancouver, B.C.

2. **Empire Builder** (Chicago – St. Paul/Minneapolis – Milwaukee – Spokane – Portland/Seattle). This long-distance Amtrak-supported route runs one round-trip daily between Chicago and the Pacific Northwest. The *Empire Builder* splits in Spokane and has two western termini: Portland and Seattle. Portland is the *Empire Builder*'s only stop in Oregon.[1]

3. **Coast Starlight** (Los Angeles – Oakland – Sacramento – Portland – Seattle). The second most popular long-distance train in the Amtrak system, this Amtrak-supported train runs one round-trip daily between Los Angeles and Seattle. In Oregon, the *Coast Starlight* serves Klamath Falls, Chemult, Eugene, Albany, Salem, and Portland.

In total, Oregon features seven intercity rail stations. Table 4.1 shows Oregon's intercity passenger rail stations, the number of daily trains, and the percent of Oregon's Amtrak ridership with boardings at each station.

Table 4.1 Oregon Intercity Passenger Rail Stations

Station	Intercity Rail Connections	Trains Per Day	Percent of Total Boardings
Portland Union Station	Amtrak *Empire Builder*, Amtrak *Coast Starlight*, Amtrak Cascades	Builder: Originates – 1 Terminates – 1 Coast Starlight: 1 roundtrip Cascades: Originates (NB) – 3 Terminates (NB) – 1 Thru (NB) – 1 Terminates (SB) – 2 Thru (SB) - 1	40.8%
Oregon City Platform	Amtrak Cascades	2 round-trips	0.6%
Salem Station	Amtrak *Coast Starlight*, Amtrak Cascades	3 round-trips	4.0%

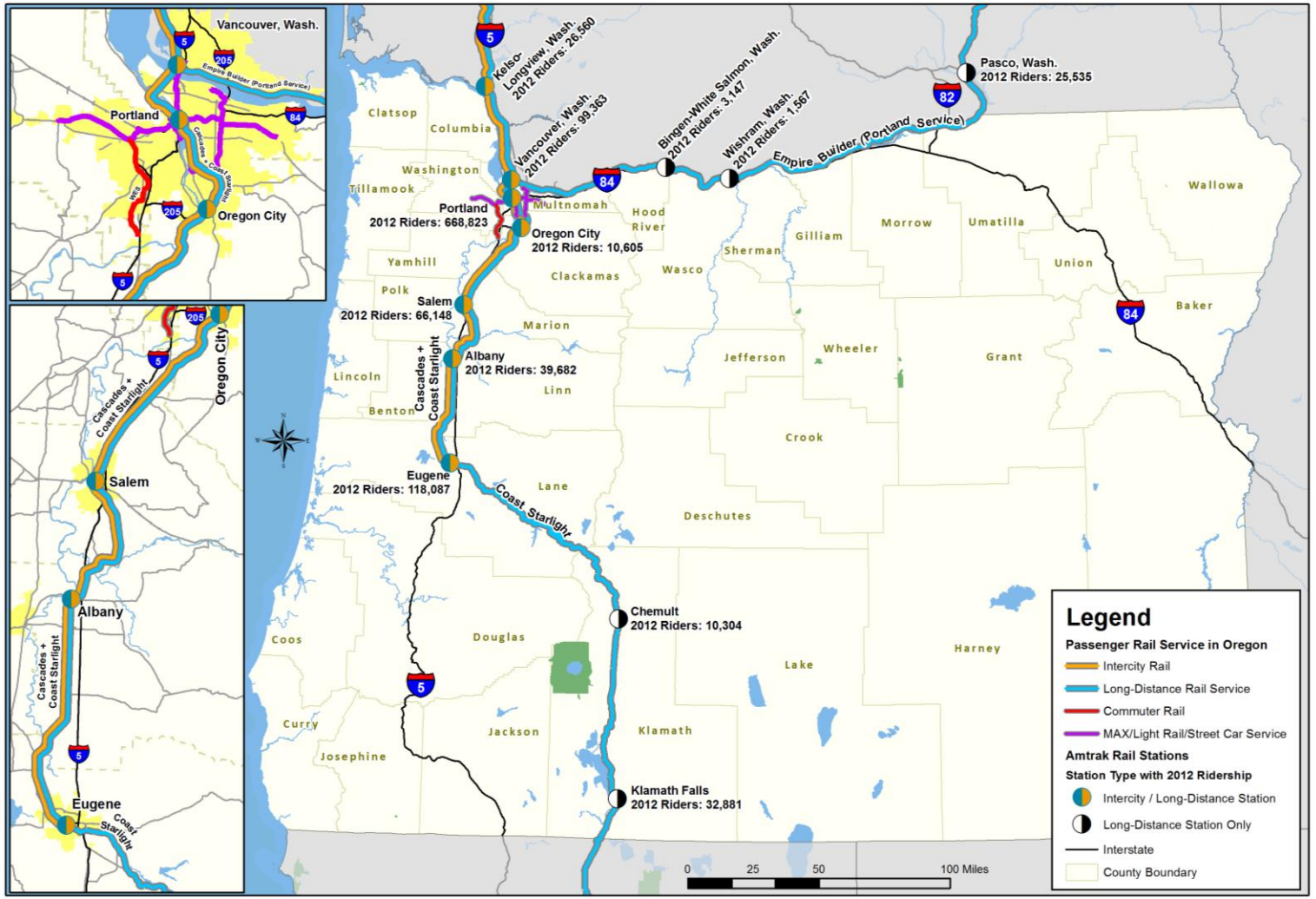
[1] The *Empire Builder* serves Hood River and The Dalles through stations at Bingham/White Salmon and Wishram, Washington. The majority of the patronage using these stations is traveling to or from Oregon communities.

Station	Intercity Rail Connections	Trains Per Day	Percent of Total Boardings
Albany Station	Amtrak *Coast Starlight*, Amtrak Cascades	3 round-trips	2.5%
Eugene Station	Amtrak *Coast Starlight*, Amtrak Cascades	3 round-trips	7.3%
Chemult Platform	Amtrak *Coast Starlight*	1 round-trips	0.6%
Klamath Falls Station	Amtrak *Coast Starlight*	1 round-trip	2.0%

Source: Amtrak.

Note: Oregon's Amtrak ridership includes all trips for which the origin and/or destination is in Oregon. This includes intrastate trips and interstate trips beginning or ending in Oregon. Approximately 42 percent of these Amtrak trips' boardings are at stations outside Oregon.

Figure 4.1 Intercity Rail Service in Oregon



Source: Cambridge Systematics and Oregon Department of Transportation – Rail Division, 2013.

Existing Intercity Rail Ridership

Table 4.2 shows the percent of total Amtrak trips with an origin and/or destination at each of Oregon's stations during Fiscal Year (FY) 2012. This table includes all Amtrak trips for which the origin and/or destination is within Oregon. In aggregate, stations outside Oregon represent the largest percentage of total boardings (42.3 percent), followed closely by Portland's Union Station (40.8 percent). The Amtrak stations with the next largest number of boardings as a percent of total trips that begin and/or end in Oregon are Eugene (7.3 percent), Salem (4.0 percent), and Albany (2.5 percent).

During FY 2012, nearly 16 percent of the state's total Amtrak intercity rail trips (shown in Table 4.3) were intrastate trips in which both the traveler's origin and destination were in Oregon. The state's top three intrastate Amtrak travel markets were:

1. **Portland- Eugene**. 54.3 percent of total boardings in Eugene were bound for Portland, and 7.5 percent of total boardings in Portland alighted in Eugene.
2. **Portland-Salem**. 46.7 percent of total boardings in Salem were headed to Portland, and just over 3.5 percent of total boardings in Portland alighted in Salem.
3. **Portland-Albany**: 43.7 percent of total boardings in Albany were bound for Portland, and just under 1.7 percent of total boardings in Portland alighted in Albany.

Note that the percent of total trips between Portland and other Oregon cities is relatively small, since 86.1 percent of Amtrak trips originating in Portland have destinations out of the state.

Travel between cities in Oregon for which Portland was not an origin or destination represented a relatively small share of Oregon's total interstate and intrastate trips. The largest travel markets between cities other than Portland were Salem-Eugene (0.6 percent of total boardings and alightings), Albany-Salem (0.4 percent), Eugene-Klamath Falls (0.4 percent), and Eugene to Oregon City (0.4 percent).

Nearly 85 percent of Amtrak trips with an origin and/or destination in Oregon were interstate trips during FY 2012. Portland features the largest share of boardings for trips with destinations outside the state (35.2 percent). The two stations with the next largest number of interstate trips had significantly fewer interstate boardings. Approximately 2.5 percent of trips originating in Eugene and 1.4 percent of trips originating in Salem had destinations outside of Oregon.

Table 4.2 Intercity Passenger Rail Ridership to and from Oregon Stations as a Percent of Total Ridership, FY 2012

	Destination								
Origin	**Albany**	**Chemult**	**Eugene**	**Klamath Falls**	**Oregon City**	**Portland**	**Salem**	**Out of State**	**Total Boardings**
Albany	-	0.0	0.1	0.1	0.0	1.1	0.2	1.0	2.5%
Chemult	0.0	-	0.0	0.0	0.0	0.0	0.0	0.5	0.6%
Eugene	0.1	0.0	-	0.2	0.2	3.9	0.3	2.5	7.3%
Klamath Falls	0.1	0.0	0.2	-	0.0	0.4	0.1	1.1	2.0%
Oregon City	0.0	0.0	0.2	0.0	-	0.1	0.0	0.3	0.6%
Portland	0.7	0.0	3.1	0.4	0.0	-	1.4	35.2	40.8%
Salem	0.2	0.0	0.3	0.1	0.0	1.9	-	1.4	4.0%
Out of State	1.3	0.6	3.4	1.2	0.4	33.5	2.0	-	42.3%
Total Alightings	2.4	0.7	7.2	2.1	0.7	41.0	4.1	41.9	100%

Table 4.3 Destinations of Amtrak Trips Originating at Oregon Stations as a Percent of Total Ridership by Station, FY 2012

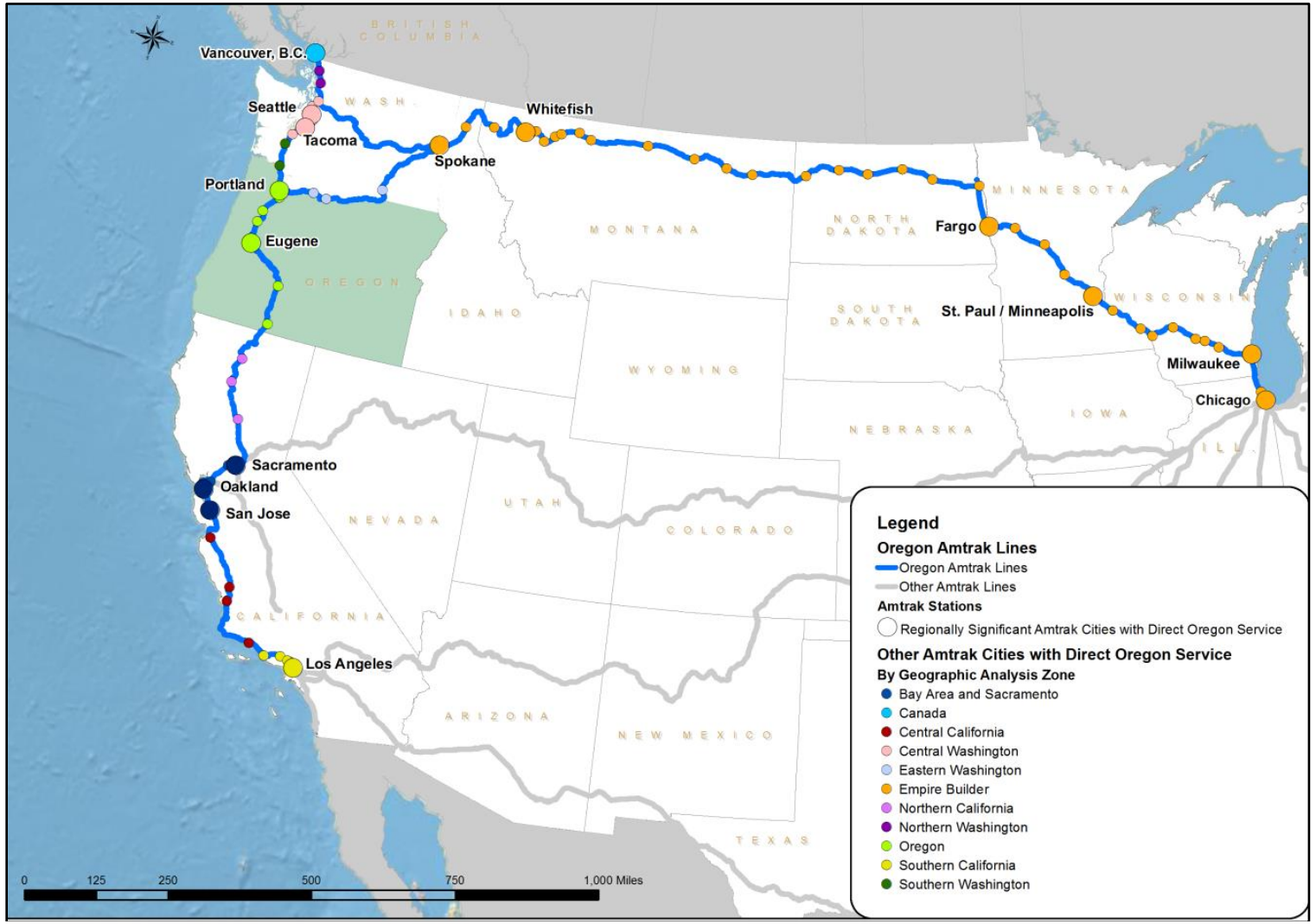
	Destination								
Origin	**Albany**	**Chemult**	**Eugene**	**Klamath Falls**	**Oregon City**	**Portland**	**Salem**	**Other**	**Total Boardings**
Albany	-	0.5	3.4	3.1	1.8	43.7	9.2	38.4	100%
Chemult	1.1	-	5.5	2.1	0.0	5.6	2.0	83.7	100%
Eugene	1.2	0.4	-	3.2	2.1	54.3	4.6	34.2	100%
Klamath Falls	3.9	0.9	10.7	-	0.0	22.9	7.3	54.3	100%
Oregon City	6.5	0.0	25.5	0.0	-	20.3	5.7	42.0	100%
Portland	1.7	0.1	7.5	1.1	0.1	-	3.5	86.1	100%
Salem	4.8	0.4	7.1	3.4	1.0	46.7	-	36.6	100%
Other	3.0	1.3	7.9	2.8	1.0	79.3	4.6	-	100%

Table 4.4 shows the percentage of intercity passenger rail trips between Oregon and select travel markets accessible by Amtrak intercity passenger rail service. Figure 4.2 illustrates the locations of each of the travel markets listed in Table 4.4. The most heavily traveled corridor is between Oregon and Seattle, which is served by Cascades and *Coast Starlight* routes, and accounts for 55.1 percent of all trips. Intrastate travel within Oregon represented the next busiest Amtrak market (15.8 percent). The corridor to the Bay Area and Sacramento, which is served by the *Coast Starlight*, and destinations along the *Empire Builder* corridor followed with 8.4 percent and 5.8 percent of total ridership, respectively.

Table 4.4 FY 2012 Interstate Travel Between Oregon and Select Travel Markets

Travel Market	Total Corridor Travel
Southern California	3.2%
Central California	1.1%
Bay Area and Sacramento	8.4%
Northern California	1.0%
Oregon (Intrastate)	15.8%
Southern Washington	2.3%
Central Washington(Puget Sound Vicinity)	55.1%
Eastern Washington	3.1%
Northern Washington	1.9%
Empire Builder	5.8%
Canada	2.3%
Total	**100.0%**

Figure 4.2 Amtrak Travel Markets Directly Accessible from Oregon



Ridership Trends

Intercity passenger rail ridership along the Amtrak Cascades corridor increased steadily over the previous two decades (see Figure 4.3). Between 2000 and 2012, ridership along the corridor grew 57.7 percent, from 530,000 to over 836,000.[2] Factors that have contributed to the ridership experienced in recent years include:

- Population growth;[3]
- Rising costs and diminished performance through congestion, etc. associated with highway travel;
- Aging populations that cannot or choose not to drive and require alternate travel options;
- Growing environmental awareness and concerns about climate change;
- Improved information and communication technology (ICT) and intelligent transportation systems (ITS) that ease rail system use and enhance the travel experience; and,
- Public and private investments that improve rail service.[4,5]

As Figure 4.3 indicates, while periods of stagnant growth such as the recessions at the beginning and end of the previous decade caused a leveling off or slight dips in ridership, overall ridership has grown consistently over the past two decades.

The 2006 Oregon Transportation Plan forecasted public transportation ridership to increase by an annual rate of 3.2 percent between 2005 and 2030, and passenger rail ridership to grow by 3.6 percent annually during the same period.

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[2] Washington DOT Rail Division. Amtrak Cascades: 2012 Performance Data Report, February 2013.

[3] As per the 2010 Oregon Rail Study, planning agencies have forecast population to grow by as much as 44 percent, over one million people, between 2000 and 2030 in the Willamette Valley.

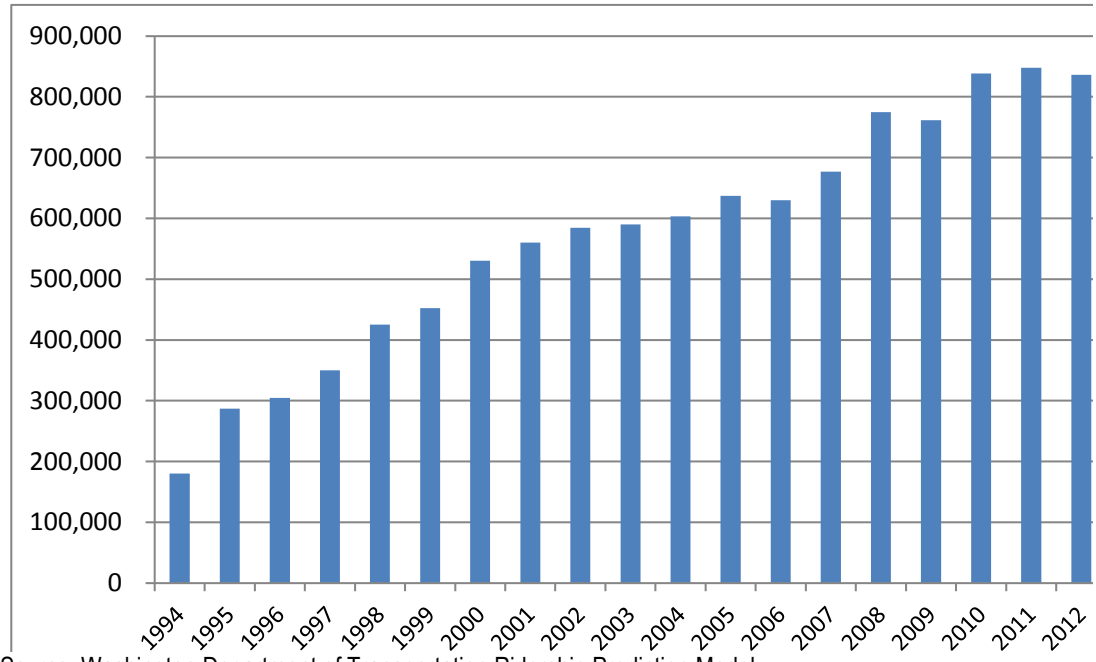
[4] FHWA Office of Policy and Governmental Affairs, Transportation Studies (HPTS). The Next Generation of Travel: Research, Analysis and Scenario Development - Literature Scan Report Summary, November 2011. Available at: https://www.fhwa.dot.gov/policy/otps/nextgen_htps_scan.cfm (last accessed on May 10, 2013)

[5] Benjamin J. Wickizer and Andrew Snow (2011) "Rediscovering the Transportation Frontier: Improving Sustainability in the United States through Passenger Rail," *Sustainable Development Law & Policy*: Vol. 11: Issue 1, Article 8. Available at: http://digitalcommons.wcl.american.edu/sdlp/vol11/iss1/8 (last accessed on May 10, 2013)

In comparison, the plan forecasted highway vehicle miles traveled to grow by a lower annual rate of 1.4 percent between 2004 and 2030.

Actual intercity passenger rail ridership along the Cascades corridor increased at a compound average annual rate of 4.0 percent between 2005 and 2012. Thus, despite the economic recession that occurred during this period, actual ridership growth outpaced the average annual growth rate of 3.6 percent forecasted in the 2006 Oregon Transportation Plan. Additionally, annual Cascades ridership growth exceeded average annual statewide population growth (1.0 percent[6]) between 2005 and 2012, which suggests that intercity passenger rail's market share is likely increasing relative to other modes. Overall, these trends indicate a steadily growing demand for intercity passenger rail services.

Figure 4.3 Amtrak Cascades Ridership, 1994-2012



Source: Washington Department of Transportation Ridership Prediction Model.

4.2 EXISTING PASSENGER RAIL SYSTEM PERFORMANCE

This section assesses existing corridor system performance in the context of the service goals defined in the 2010 Oregon Rail Study, and, where applicable,

[6] Population Research Center, Portland State University, *Population and Components of Population Change for Oregon: 1960 to 2012*, http://www.pdx.edu/prc/annual-oregon-population-report, accessed June 5, 2013.

suggests potential improvements to enhance future operations. Performance is examined in the context of timekeeping, service frequency, travel times, reliability, safety, and security.

The 2010 Oregon Rail Study developed a set of goals that would guide improvements to intercity passenger rail service in the I-5 corridor between Portland and Eugene. In part, these goals were established to assess the relative merits of improving the Union Pacific's (UP) mainline, where passenger trains run today, and Portland & Western's former Oregon Electric Line (OE). The draft service goals included:

- **On-time performance**. Increase on-time performance of passenger trains from 68 percent to at least 95 percent;[7]
- **Service frequency**. Increase daily round-trips from two to six or more;
- **Train speeds**. Increase average passenger train speeds from 42 to 65 mph;
- **Travel times.** Reduce passenger rail trip time between Eugene and Portland from two hours and 35 minutes to two hours or less – the same time required to drive between these cities by freeway;
- **Freight rail accommodation**. Avoid negative impacts to freight rail capacity and operations.

These general goals underlie the environmental review process that is presently underway (further discussed in Section 4.3), and will result in specific recommendations for how they will be addressed.

On-Time Performance

Reliable, on-time service is essential for attracting and retaining intercity rail passengers. To improve on-time performance (OTP) along the Cascades corridor, ODOT established a goal to increase OTP from 68 percent in 2009/2010 to 95 percent.

Cascades OTP data is collected and maintained by Amtrak and ODOT, and each agency measures OTP differently. Amtrak measures Endpoint OTP[8] and All-

[7] On-time performance (OTP) of the Cascades has greatly improved since the 2010 Oregon Rail Study was published. For the portion of the route between Portland and Eugene, the Cascades UP OTP generally ranged between 85 and 100 percent between July 2012 and April 2013. Public OTP along this section of the Cascades primarily ranged between 75 and 90 percent.

[8] Endpoint OTP measures whether or not a train arrives at its endpoint on time. An "on-time arrival" is dependent upon trip length. As described in more detail in the *Rail System Inventory,* longer trips are allowed additional delay time.

Stations OTP[9] data for stations throughout the corridor, which extends outside of Oregon. These measures are provided at the overall corridor level. To provide a picture of Cascades performance specifically within Oregon, ODOT separately measures OTP for the Portland-Eugene corridor segment.

Amtrak's Endpoint OTP and All-Stations OTP performance metrics for the Cascades are provided below for reference:

- FY 2010, Endpoint OTP must be at least 80 percent;
- By FY 2014, Endpoint OTP must be at least 85 percent;
- Effective FY 2012, All-Stations OTP must be at least 80 percent; and
- By FY 2014, All-Stations OTP must be at least 85 percent.

Table 4.5 displays the Cascades on-time performance information for FY 2012. Despite a decline in OTP between January and March 2012, measures of OTP throughout the Cascades corridor have improved slightly between October 2011 and December 2012. The period January to March 2013 was the first quarter that both Endpoint OTP (81.2 percent) and All-Stations OTP (81.3 percent) exceeded Amtraks' OTP target (80.0 percent) in each category.

Table 4.5 Amtrak Cascades On-Time Performance by Quarter (October 2011 to December 2012)

Month	Endpoint OTP	All-Stations OTP
October-December 2011 (Q1)	**77.6%**	80.3%
January-March 2012 (Q2)	**69.3%**	**75.8%**
April-June 2012 (Q3)	**75.8%**	81.4%
July-September 2012 (Q4)	**73.4%**	**77.4%**
October-December 2012 (Q1)	81.2%	81.3%

Note: Values that do not meet standard defined by Section 207 of PRIIA (80 percent) are in **bold**.

Source: FRA, *Quarterly Report on the Performance and Service Quality of Intercity Passenger Train Operations*. Multiple reports were consulted: Quarter Ended December 2012 – Quarter Ended December 2013. Accessed May 2013 from https://www.fra.dot.gov/Page/P0532.

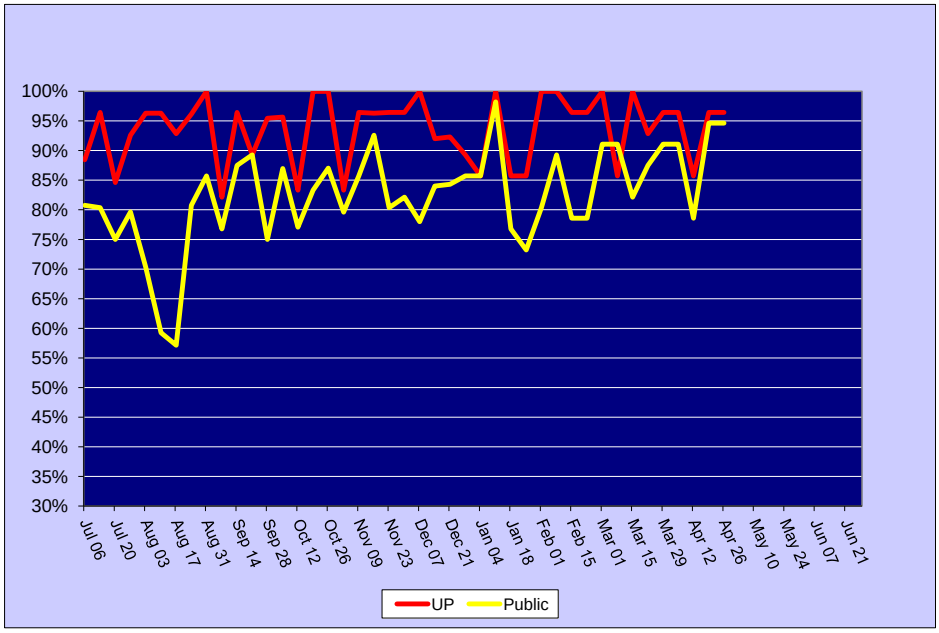
[9] All-Stations OTP compares a train's actual performance to its published schedule, including all stations beginning with the origin and ending with the destination station. The actual departure and actual arrival times are used in this measurement for the specified period. Each departure or arrival constitutes one "instance." A train is considered "on-time" if each instance is within 15 minutes of the schedule. In the case that no time is recorded at a station, that instance is excluded.

In addition to these corridor-wide metrics, ODOT tracks two OTP metrics along the Cascades route between Portland and Eugene (see Figure 4.4):

- UP OTP, which measures the percentage of trains that run within 10 minutes of the scheduled travel time between Portland and Eugene (2 hours and 35 minutes); and
- Public OTP, which measures the percent of trains that arrive within 10 minutes of the time printed on the public schedule.

Factors driving on-time performance are divided between the host railroad and Amtrak. For the host railroad, delays are most commonly caused by dispatching errors, freight train interference, and slow orders related to temporary track conditions and/or signal outages. Typical Amtrak-related delays are caused by heavy/slow passenger loading at stations, holding for connections from other trains and buses, late arriving crews, and mechanical problems. For example, the evidently extensive delays in August 2012 that are apparent in Figure 4.4 were largely caused by Amtrak, not Union Pacific.

Figure 4.4 Amtrak Cascades On-Time Performance in Oregon (By Week, July 2012-April 2013)



Source: Oregon Department of Transportation – Rail Division, 2013.

Notes: Includes OTP for northbound trains 500 and 504 and southbound trains 507 and 509.
OTP was measured weekly between July 2012 and April 2013.

As these numbers indicate, passenger rail OTP within Oregon has exceeded corridor-wide OTP tracked by Amtrak. For the portion between Portland and

Eugene, the Cascades route's UP OTP generally ranged between 85 and 100 percent between July 2012 and April 2013. Public OTP along this section of the Cascades primarily ranged between 75 and 90 percent. These data suggest Amtrak trains have approached but generally not attained the State's 95 percent OTP goal for the corridor.

Service Frequency

Increased intercity passenger rail service frequency enables additional rider capacity and offers more convenient scheduling options for passengers. To improve service frequency along the Cascades corridor, ODOT established the goal to increase daily roundtrips from two (in 2009) to six or more.

Current service still includes two daily round-trip trains between Eugene and Portland. Schedules are designed to accommodate day travel from the Willamette Valley to Portland, with northbound trains departing Eugene at 5:30 a.m. and 9:00 a.m., and the southbound trains departing from Portland at 6:05 p.m. and 9:30 p.m. Mid-day departures are provided by the *Coast Starlight*, with the northbound train leaving Eugene at 12:36 and a southbound departure from Portland at 2:25 p.m. Unfortunately, this train operates with less reliability than the Cascades services, particularly in the northbound direction. Additional service frequencies are made difficult by frequent freight rail services that share what is largely a single track railroad. (see Section 3.0).

Train Speed and Reliability

Convenient rail service that operates at higher average speeds and offers reduced travel times offers a more convenient and reliable alternative to potential riders. ODOT established a goal to increase average passenger train speeds in the Cascades corridor from 42 mph (in 2009) to 65 mph.

As currently configured, passenger trains speeds over the route between Portland and Eugene average 42 mph. Although the line can support speeds of up to 79 mph for passenger trains, this is only possible on seven miles. Reasons for this slow average speed are several, but are primarily caused by track geometry, speed restrictions through heavily populated areas, and accommodation for freight traffic. At present, the line has little reserve capacity, and is configured to handle only the modest traffic volumes that now utilize it.

Travel Time

Travel times that significantly exceed available alternatives are one of the greatest impediments to attracting additional rail passenger ridership. A passenger rail system that offers more competitive travel times will have more success convincing travelers to shift modes from automobiles to train. ODOT established a goal to reduce trip times between Eugene and Portland from two hours and 35 minutes in 2009 to two hours or less – a comparable freeway drive time during off-peak times between these cities. Reducing travel time will

require significant improvements to the infrastructure of the current UP route, or establishment of a new route connecting these markets. These issues are being explored in the ongoing passenger service study. (see Section 3.0).

Safety and Security

Ensuring the safety and security of the passenger rail system is of the highest priority. In addition to providing for passengers' welfare, a safe and secure system has the added benefit of retaining ridership and ensuring efficient operations. Rail safety issues resulting in injuries and fatalities – which often result in substantial delays to passenger trains - are most commonly associated with:

- Conflicts at grade crossings;
- Trespassing on railroad property; and
- Poor pedestrian conditions.

Most typically, these issues are addressed through a combination of physical improvements and education. Physical improvements include crossing gates and active warning systems, installation of fencing and other barriers to prevent incursions on the right of way, track and signal improvements, and grade separations that eliminate at-grade crossings of rail lines and roadways. The rail industry has had a long-standing educational campaign through Operation Lifesaver which is designed to educate the public about the risks of trespassing on railroad property and the importance of using caution around railroad tracks and trains. This section presents railroad safety data maintained by the FRA's Office of Safety Analysis, including railroad accidents/incidents and casualties.

Accidents/Incidents

FRA divides train incidents into three categories:

- Train accidents,
- Highway-rail incidents, and
- Other incidents - activities such as getting on/off equipment, maintenance work along the right of way, throwing switches, setting handbrakes, stumbling, tripping and trespassing.

The total accidents and incidents is the sum of train accidents, highway-rail incidents, and other incidents. There were 35 accidents/incidents involving Amtrak and commuter railroads in Oregon reported in 2012 (0.8 percent of the U.S. total). Nationwide, there were 121 passenger train accidents in 2012, of which one occurred in Oregon (0.8 percent).

Table 4.6 shows the annual number of casualties caused by Amtrak incidents between 2008 and 2012. During this period, an average of 28.6 casualties

occurred each year with an average of 2.8 fatalities and 25.8 injuries. In 2012, highway-rail and trespassing incidents accounted for 100 percent of the fatalities.

Table 4.6 Casualties Involving Amtrak and Commuter Rail Operations in Oregon by Severity, 2008-2012

Casualties	2008	2009	2010	2011	2012	5-Yr Average
Fatalities	6	1	2	1	4	2.8
Injuries	28	13	28	33	27	25.8
Total	**34**	**14**	**30**	**34**	**31**	**28.6**

Source: FRA Office of Safety Analysis

Table 4.7 breaks down the location of casualties by county. Clackamas County has the highest casualty rate in Oregon (50.0 casualties per 100 Amtrak miles), followed by Klamath (7.0), Multnomah (5.3), and Lane (5.1).

Table 4.7 Amtrak and Commuter Railroad Casualties in Oregon by County, 2008-2012

County	Amtrak Miles operated in Oregon	2008	2009	2010	2011	2012	5-Yr Average	Casualty Rate (No. of Casualties per 100 Miles)
Multnomah	15	0	0	2	1	1	0.8	5.3
Clackamas	21.6	11	4	9	14	16	10.8	50.0
Marion	44.7	2	1	1	2	2	1.6	3.6
Linn	35.9	0	1	0	0	1	0.4	1.1
Lane	102	7	0	10	4	5	5.2	5.1
Klamath	125.6	14	5	6	13	6	8.8	7.0
Umatilla	n/a	0	1	0	0	0	0.2	n/a
Washington	n/a	0	2	1	0	0	0.6	n/a
Harney	n/a	0	0	1	0	0	0.2	n/a
Total Number of Casualties	**344.8**	**34**	**14**	**30**	**34**	**31**	**28.6**	**72.1**

Sources: FRA Office of Safety Analysis and Oregon Rail GIS Database.

Table 4.8 provides detail on which types of people were victims of passenger railroad casualties (injuries and fatalities) in Oregon.

Table 4.8 Casualties Involving Amtrak and Commuter Rail Operations in Oregon by Type of Person, 2008-2012

Person Injured/Killed	2008	2009	2010	2011	2012	5-Yr Average
Railroad Employee On Duty	3	5	10	4	1	4.6
Railroad Employee Not On Duty	0	1	1	0	0	0.4
Passenger	19	5	14	18	18[1]	14.8
Non-trespasser	5	2	2	6	6	4.2
Trespasser	7	1	3	6	6	4.6
Total	**34**	**14**	**30**	**34**	**31**	**28.6**

Source: FRA Office of Safety Analysis

[1] Passenger incidents include all circumstances such as getting off/on standing trains, assaults, crossing incidents, stumbling aboard trains, etc.

4.3 CASCADES CORRIDOR PHYSICAL AND OPERATIONAL NEEDS

This section evaluates the capacity of the rail system's infrastructure and rolling stock to meet Oregon's draft service goals and serve the state's travel needs, and discusses potential improvements to existing Cascades service.

The Amtrak Cascades Corridor Constraints

Existing Passenger Rail Service

Amtrak Cascades in Oregon currently operates on fewer than 10 route miles on BNSF and approximately 125 route miles on UP owned trackage. The capacity and operational needs of the freight rail system therefore place the greatest constraints on passenger rail service. Coordinated planning with freight rail operators is a necessity to ensure efficient and reliable passenger rail service.

Amtrak Cascades passenger rail service faces competition from other modes of passenger transportation, particularly private motor vehicles and intercity buses. Commercial air services are present in Portland, Eugene, Seattle-Tacoma and Bellingham, Washington and Vancouver, B.C., Canada. The vast majority of trips along the corridor are taken by private automobile, with air playing a much smaller role except in the Vancouver, B.C. market.

Expanding rail's participation in this corridor will require addressing three key constraints: travel times and reliability, frequency, and connectivity. A fourth element, service quality (amenities, comfort, access to Wi-Fi, mobile phone connectivity, on-board food, etc.) also plays a significant role. In the case of the Cascades, service quality is perceived to be good, and thus not a constraint to growth.

- **Travel times and reliability.** The scheduled end-to-end passenger rail travel time between Eugene and Portland's Union Station averaged 2 hours and 35 minutes (not including delay) in 2012, approximately 35 minutes longer than the time it takes to travel the same distance in a private passenger vehicle. Increased traffic congestion on the I-5 corridor and/or improved travel times that are at least as fast as travel by private automobile will make passenger rail more competitive. Reliability is a key element as well; if the trains are reliable, travelers are more likely to use them.
- **Frequency.** The present two round-trips (three if the *Coast Starlight* is included) between Eugene and Portland do not provide sufficient schedule flexibility for many travelers who are constrained for time, which is particularly the case for business travelers. The Thruway buses that fill in the schedule gaps help in this regard, but they do not provide the same level of comfort and amenities and service consistency that are available on the train. Furthermore, current schedules are set to allow for day trips to Portland from the Willamette Valley, but not vice versa.

- **Connectivity.** Improving access to stations and public transportation system connectivity can lower the overall time and effort required to use the Cascades service. Under the right conditions, conventional passenger rail can be competitive with air travel along distances of less than about 200 miles.

Future Ridership

New ridership forecasts for the Cascades corridor are being developed as part of the Oregon Passenger Rail EIS Project that is currently underway. Thus, the ridership forecasts provided below are drawn from the 2006 *Washington State Long Range Plan for Amtrak Cascades*, and the 2010 *Oregon Rail Study*. These two reports provide forecasts for Portland to Seattle (and on to Vancouver, B.C.), and Portland to Eugene, respectively.

Seattle to Portland

The 2006 *Washington State Long-Range Plan for Amtrak Cascades* offers the most recent ridership forecast for the Portland-Seattle corridor. The forecast assumed specific physical and operational improvements by 2023 that would permit 13 round trips between Seattle and Portland, and travel times of 2:30 instead of 3:30. With these improvements, ridership was projected to increase from 374,008 passengers in 2005 to 1,916,400 passengers by 2023, an annual growth rate of approximately 9.5 percent.[10] This growth rates compares to the actual 4.0 percent compound annual growth rate (CAGR) that has occurred over the past two decades. In part, the plan envisioned a more aggressive schedule of investments than has actually occurred thus far, even with the $800 million in improvements that are currently underway.

Portland to Eugene

The 2010 Oregon Rail Study provides forecasts in the Portland to Eugene markets based on a range of planning alternatives and estimated service mixes intended to fulfill the service goals outlined in Section 4.2.

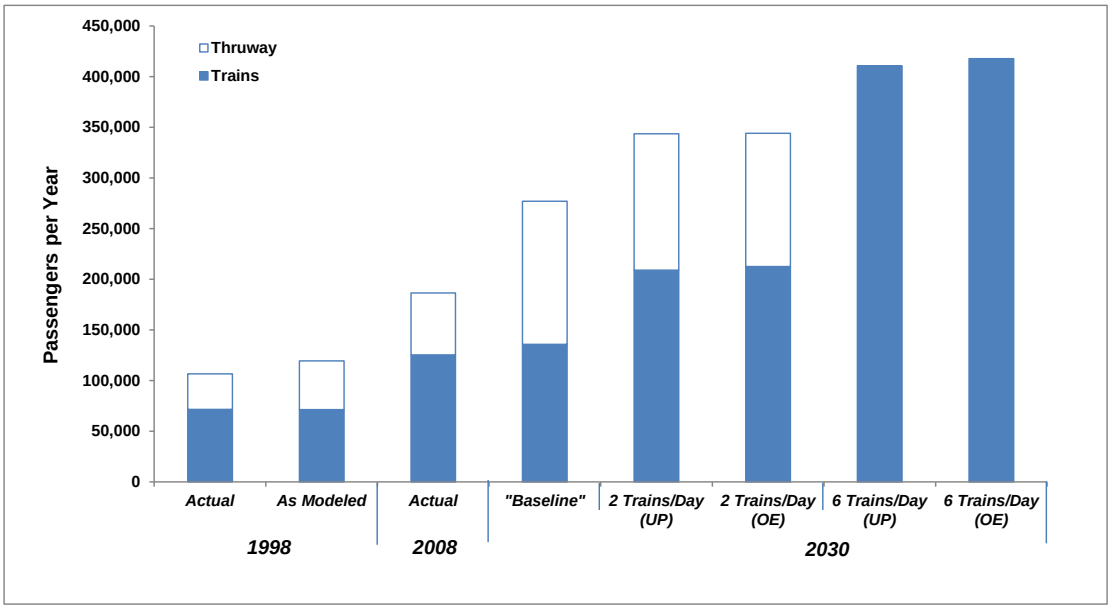
The ridership estimates under the different scenarios are shown in Figure 4.5 below. The analysis showed that should goals be met, ridership could expect to more than double (increasing by 120-124 percent) by 2030, or about 3.7 percent annually. Should service levels remain the same with a concurrent train speed increase due to targeted track improvements, ridership is estimated to grow by 84- 85 percent by 2030, or about 2.8 percent annually.

Assuming the same service levels as 2008 and no additional improvements to the line, travel times are expected to degrade to over three hours per trip. In

[10] The WSDOT Ridership Model applies multivariate linear regression to estimate corridor- and station-level ridership through 2035.

addition, traffic congestion on I-5 will slow speeds for Thruway buses and limit the growth of ridership on those buses between 2008 and 2030.

Figure 4.5 Future Amtrak Cascades Passenger Rail Demand: Eugene-Portland, 2030



Source: 2010 Oregon Rail Study.

Oregon Passenger Rail Project

As mentioned previously, ODOT is leading the Oregon Passenger Rail EIS (OPR) Project to improve passenger rail service between Portland and the Eugene-Springfield urban area. This 125-mile segment is part of the Pacific Northwest Rail Corridor (PNWRC), which is one of 11 federally-designated high-speed rail corridors in the country.

This project will consider alternatives for improving passenger rail service along the corridor given the following objectives:

- Provide an efficient, safe, and cost-effective transportation alternative that is integrated with other transportation modes, including automobile, transit, bike, and pedestrian.
- Protect freight-rail capacity.
- Support the implementation of regional high-speed passenger rail service along PNWRC.
- Promote economic development in Oregon.
- Avoid or mitigate community and environmental impacts.

Currently, ODOT and the Federal Railroad Administration are preparing an Environmental Impact Statement (EIS). This environmental review process will

inform key decisions, including route alignment and station locations. The project website[11] provides the most recent information on the project.

Once route and station locations are determined, the project will consider service characteristics, including the number of daily trips, travel time objectives, and technology to use along the corridor. To ensure collaboration and that stakeholders are involved in the decision making process, OPR includes extensive public involvement.

Challenges to Improving Cascades Service

The following infrastructure constraints provide examples of items that may need to be addressed to fulfill passenger rail operational goals. They are not intended to propose any one solution and readers should refer to the Oregon Passenger Rail Project for more detailed information.

- **Portland to Vancouver, WA**. Amtrak Cascades trains operate over a 10-mile segment owned by BNSF and shared with UP between Portland Union Station and Vancouver, Washington. Projected growth in freight volumes will result in a critical bottleneck along this continuous double track segment.[12] Corridor improvements, such as a third mainline track would help avoid adverse effects on passenger rail service in terms of train delays and also handle the anticipated growth in travel north of Portland. This example would require construction of a new rail bridge across the Columbia River.
- **Portland to Eugene**. Amtrak Cascades trains operate over UP between Eugene and Portland Union Station. This 125-mile is largely single track with passing sidings, and a 5.8-mile double track segment between Willsburg Junction (Milwaukie) and Portland Union Station. On average, passing sidings are located 9 miles apart. As mentioned in Section 3.0 growing freight demand will increase congestion and lengthen travel times along this route. Alleviating these issues could require expanding track capacity by double tracking parts or this entire segment.
- **Evaluate stations, parking and other amenities**. Amtrak Cascades and other passenger rail stakeholders have not reported strong current needs for new passenger rail stations or expanding existing stations and/or parking areas. However, to maintain and increase ridership in accordance with state goals, Amtrak and its public transit and Thruway bus connections must provide competitive costs, travel times, comfort, and convenience comparable to that

[11] Oregon Passenger Rail EIS Project Website - http://www.oregonpassengerrail.org/

[12] East St. Johns siding on BNSF's Portland-Vancouver, WA segment was recently increased in length from about 4,900 feet to about 7,700 feet using *Connect*Oregon II funds, mainly to facilitate trains to meet and pass in the heavily congested "Portland Rail Triangle".

of I-5 corridor and air travel along the length of the Amtrak Cascades corridor. Reviews of station facilities at regular intervals will help ensure that stations meet current customer needs, including facility conditions, amenities (such as Wi-Fi), vehicular and bicycle parking, and transit operations.

4.4 OTHER POTENTIAL CORRIDORS

This section first addresses the overall competitive travel market to identify potential corridors for expansion, and then proposes several corridors that may merit further examination for new passenger rail service. Any expansion or the addition of new service, must consider more detailed evaluation and a number of factors beyond the scope of this review.

Oregon Interregional Travel Market

The vast majority of travel takes place within cities and regions where travel patterns and distances are unsuitable for intercity passenger rail. Interregional travel markets, by contrast, present areas of competitiveness for passenger rail. Table 4.11 presents interregional travel markets for all modes, as estimated in preliminary results of the Oregon Household Activity Survey (2009-2011). Note that these figures exclude travel within regions. And, Figure 4.7 shows corridors that may have potential for developing passenger rail service, as they connect cities with 20,000, or more residents.

Interregional travel is driven by the over three quarters of the state's population that resides along the I-5 corridor in the Willamette Valley south of Portland. The largest portion of total intercity travel occurs between Washington State and the Portland area (29.0 percent). The largest market for interregional travel within Oregon takes place between the Portland area and the southern Willamette Valley (27.9 percent of interregional travel). These markets constitute the majority of estimated interregional trips, and are currently served by the Amtrak Cascades route.

Of travel markets currently not served by Amtrak, the Household Activity Survey suggests the greatest potential travel markets are southern Willamette Valley - Southern Oregon (5.6 percent), which includes the cities of Medford, Grants Pass and Ashland; followed closely by Portland - North Coast (4.4 percent), which includes the cities of Astoria, Seaside, and Tillamook; and southern Willamette Valley – North Coast (3.6 percent).

Figure 4.8 highlights counties which have forecasted growth rates that are expected to exceed the state's projected average annual growth rate of 1.2 percent between 2010 and 2035. High levels of growth are expected in the greater Portland area (with the exception of Multnomah County); Jackson County in Southern Oregon; Deschutes, Crook, and Jefferson counties in Central Oregon; and Umatilla and Morrow counties in Northeast Oregon. Although Marion and Lane counties' growth rates are forecasted to be slightly below the state's growth

rate between 2010 and 2035, the counties rank four and five, respectively, in terms of total population growth forecasted between 2010 and 2035.

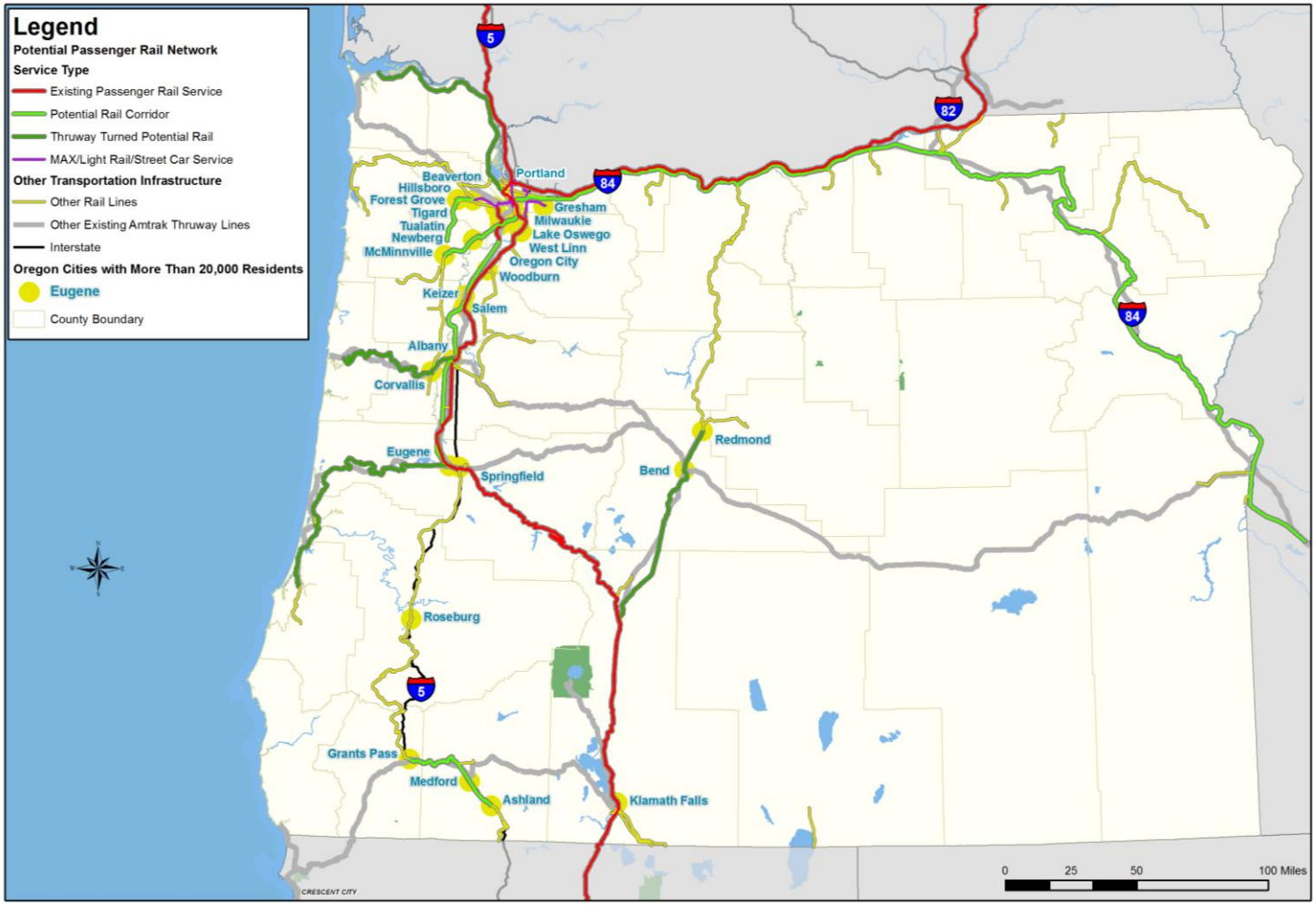
Given these projected trends and the performance of rail passenger ridership over the past two decades, it is reasonable to assume continued growth in demand for Amtrak intercity rail services both in the existing Cascades corridor and beyond. The following section identifies some potential service expansion possibilities.

Table 4.9 Estimated Interregional Travel Markets by Percentage (All Modes)

Destination >	Intrastate									Interstate		
v Origin v	Portland Area	S. Willamette Valley	Southern Oregon	Central Oregon	Columbia Gorge	Northeast Oregon	Northern Coast	Southeast Oregon	Southern Coast	WA	OTHER STATES	TOTAL
Portland Area		9.2%	0.3%	0.6%	0.9%	0.4%	1.8%	0.3%	0.1%	5.6%	0.3%	**19.7%**
S. Willamette Valley	18.7%		1.1%	0.4%	0.1%	0.1%	2.1%	0.2%	0.4%	1.5%	0.2%	**24.9%**
Southern Oregon	0.2%	4.6%		0.1%	0.0%	0.0%	0.0%	0.4%	1.2%	0.0%	0.4%	**7.4%**
Central Oregon	1.2%	0.4%	0.1%		0.3%	0.0%	0.0%	0.7%	0.0%	0.1%	0.1%	**3.0%**
Columbia Gorge	0.7%	0.1%	0.0%	0.2%		0.1%	0.0%	0.0%	0.0%	0.2%	0.0%	**1.3%**
Northeast Oregon	0.5%	0.1%	0.0%	0.2%	0.1%		0.0%	0.7%	0.0%	6.0%	0.2%	**8.2%**
Northern Coast	2.6%	1.5%	0.0%	0.0%	0.0%	0.0%		0.0%	0.5%	0.4%	0.1%	**5.3%**
Southeast Oregon	0.0%	0.2%	0.5%	0.6%	0.0%	0.0%	0.3%		0.0%	0.0%	2.1%	**5.9%**
Southern Coast	0.3%	0.7%	0.8%	0.2%	0.0%	0.0%	0.1%	0.0%		0.0%	0.2%	**2.4%**
WA	23.4%	1.0%	0.0%	0.1%	0.4%	0.2%	0.4%	0.1%	0.0%		0.1%	**25.8%**
TOTAL	**47.6%**	**17.7%**	**2.8%**	**2.3%**	**1.7%**	**0.9%**	**4.7%**	**2.5%**	**2.2%**	**13.7%**	**3.8%**	**100%**

Source: Oregon Household Activity Survey, collected 2009-2011. Preliminary results.

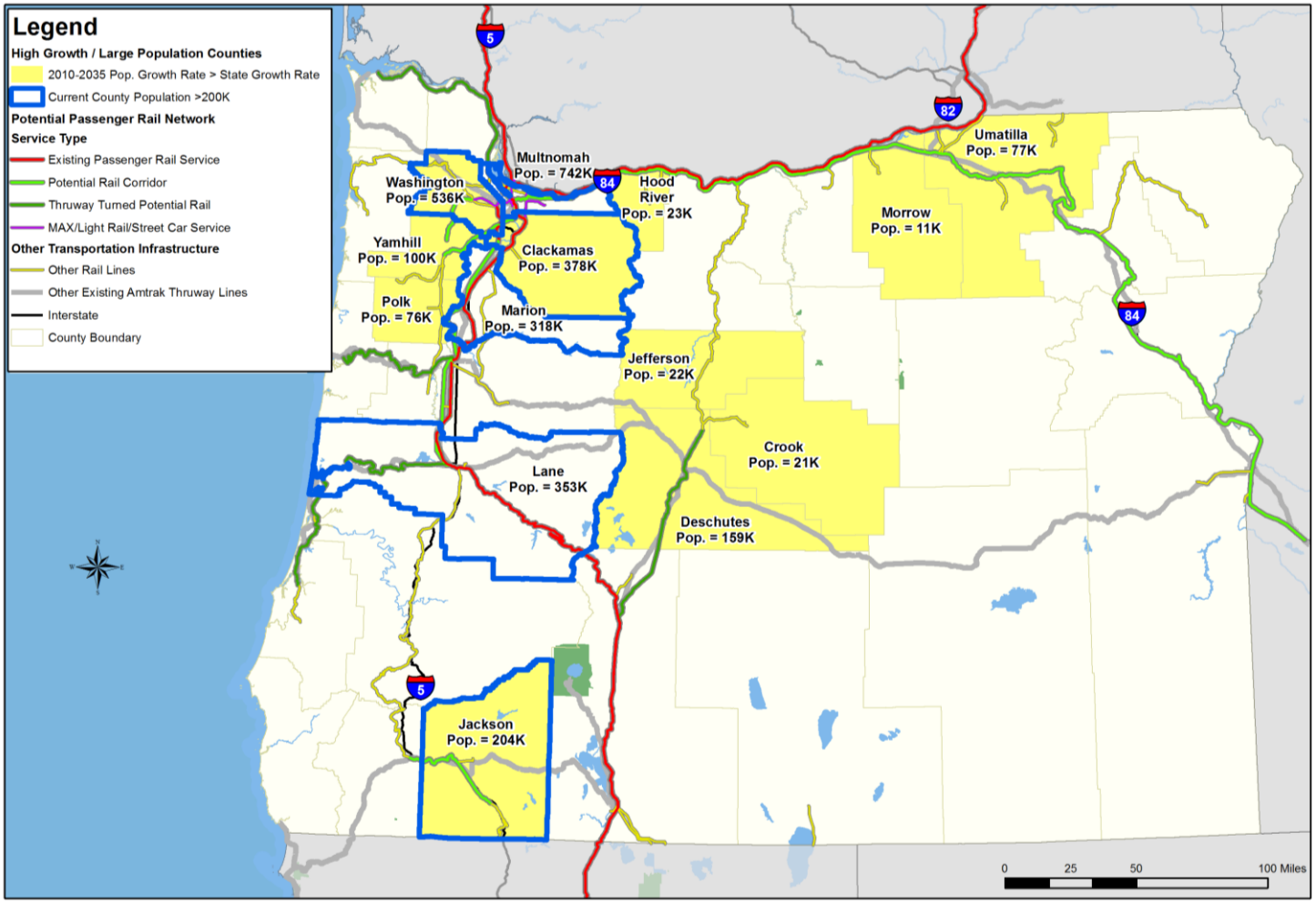
Figure 4.6 Potential Passenger Rail Network Opportunities with Cities Larger than 20,000 Residents



Source: Cambridge Systematics and Oregon Department of Transportation – Rail Division, 2013.

Note: Any expansion or the addition of new service, must consider more detailed evaluation and a number of factors beyond the scope of this review.

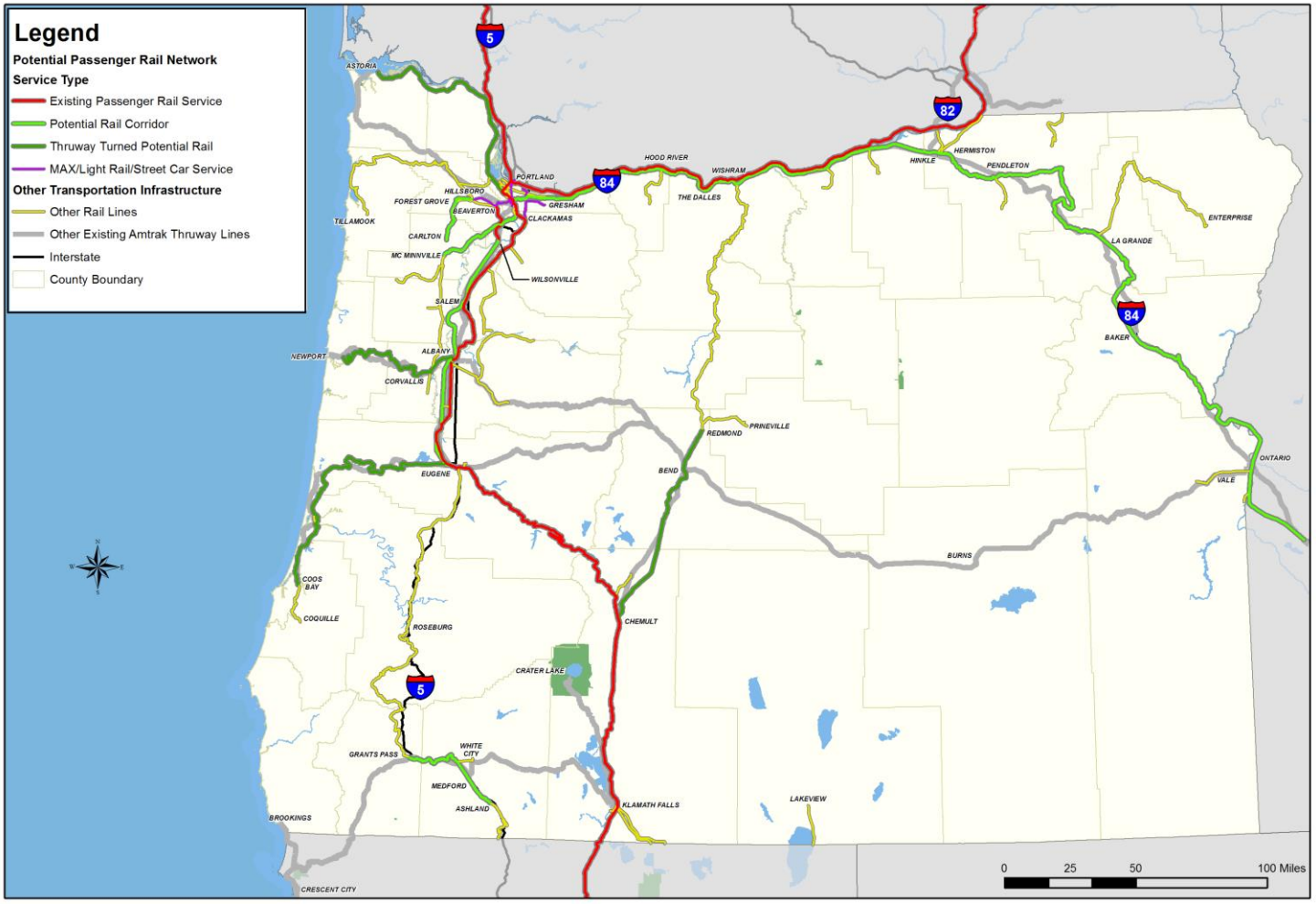
Figure 4.7 Potential Passenger Rail Network Opportunities with County Population Characteristics



Source: Cambridge Systematics and Oregon Department of Transportation – Rail Division, 2013.

Note: Any expansion or the addition of new service, must consider more detailed evaluation and a number of factors beyond the scope of this review.

Figure 4.8 Potential Passenger Rail Network Opportunities



Source: Cambridge Systematics and Oregon Department of Transportation – Rail Division, 2013.

Note: Any expansion or the addition of new service, must consider more detailed evaluation and a number of factors beyond the scope of this review.

Possibilities for Future Passenger Rail Expansion

Figure 4.9 shows existing and historical routes, as well as those that have been identified at a high level for potential passenger rail opportunities. Note that any expansion or the addition of new service, must consider more detailed evaluation and a number of factors beyond the scope of this review. The opportunities include:

- **Eugene-Ashland Corridor.** The travel market between these regions is one of the largest not served by passenger rail. The Siskiyou Line, a 25 mph shortline railroad, connects Eugene and Ashland. The Eugene to Ashland Intercity Passenger Rail Assessment[13] published in April 2010 investigated the feasibility of providing passenger service along this right of way.
- **Portland-Astoria Corridor**. The travel market analysis suggests this is another potentially underserved travel market. In the short term, Amtrak Thruway bus service could be expanded to enable more Astoria connections to Portland rail routes. In the long term, the potential for long-term rail service between these markets could be investigated.
- **Amtrak's *Pioneer* route.** Extending from Chicago to Seattle via Salt Lake City and Portland, Amtrak's *Pioneer* service operated between 1977 and 1997. The former *Pioneer* route's right of way between Portland and the Idaho state line is owned by UP. Although Oregon communities along the Columbia River can access long-distance rail service through Amtrak's *Empire Builder*, reinstatement of the *Pioneer* route would provide direct access to eastern Oregon and reconnect Portland with the major cities of the mountain west, including Boise, Salt Lake City and Denver.
- **Other Corridors**. Other corridors for which rail infrastructure is in place, but formal studies which have not been conducted include the Oakland, CA-Portland Corridor, Portland-Bend and/or Eugene-Bend, and Eugene-Coos bay. Implementation of competitive passenger service on any of these corridors would require considerable investment, primarily due to rugged topography and circuitous rail routes.

[13] 2010 Oregon Rail Study, Appendix G, Eugene to Ashland Intercity Passenger Rail Assessment https://www.oregon.gov/ODOT/RPTD/Pages/Rail-Forms.aspx

4.5 SUMMARY

Ridership trends on the Amtrak Cascades system have experienced steady growth over the past decades, despite a large and extended economic recession. This growth can be attributed in large part to the investments made by Oregon, Washington, and Amtrak in train frequencies and the popular Talgo train sets. As population grows, it is reasonable to anticipate continued demand for passenger rail services in Oregon in the coming years.

While passenger trains in the state are periodically meeting on-time performance goals, little progress has been made toward improving passenger train reliability, speed, travel times, and service frequencies between Portland and Eugene. Without improvements, the projected increase in freight rail traffic is likely to diminish the operational performance of the Amtrak Cascades and the *Coast Starlight*. Meeting these operational goals is likely to require significant investment, but would greatly increase passenger rail competitiveness with highway, and allow for anticipated ridership growth.

The primary barriers to achieving these goals along the Cascades Corridor are cost concerns and substantial capacity constraints along a predominantly single track line that must be shared with freight trains. Improvement options to address these constraints range from expanded infrastructure along the existing route to a dedicated passenger line that would not handle any freight traffic and be focused on passenger train needs. The more detailed analysis underway through the Oregon Passenger Rail Project, will allow for more detailed consideration and recommendations for the corridor. Once the EIS work is complete, an updated and/or future state rail plans will be able to incorporate and build upon the findings accordingly.